AMENDMENTS TO THE CLAIMS

1. (Currently amended) An isolated nucleic acid sequence which codes for polypeptides having Δ-4-desaturase activity, selected from the group:

a) of a nucleic acid sequence having the sequence depicted in SEQ ID NO: 1,

b) nucleic acid sequences which, as a result of the degeneracy of the genetic code, can be derived from the coding sequence comprised in SEQ ID NO: 1, ~~or~~

c) derivates of the nucleic acid sequence depicted in SEQ ID NO: 1, which code for polypeptides having the amino acid sequences depicted in SEQ ID NO: 2 ~~and~~ or a nucleic acid sequence which code for a polypeptide having ~~have~~ at least 40% homology at the amino acid level with SEQ ID NO: 2 and ~~have~~ having a Δ-4-desaturase activity.

2. (Original) The isolated nucleic acid sequence according to claim 1, where the sequence is derived from a plant.

3. (Currently amended) The isolated nucleic acid sequence according to claim 1 ~~or 2~~, where the sequence is derived from the class of Euglenophyceae.

4. (Currently amended) An amino acid sequence which is encoded by an isolated nucleic acid sequence according to ~~any of claims 1 to 3~~ claim 1.

5. (Currently amended) A gene construct comprising an isolated nucleic acid according to ~~any of claims 1 to 3~~ claim 1, where the nucleic acid is functionally connected to one or more regulatory signals.

6. (Original) The gene construct according to claim 5, wherein the nucleic acid construct comprises additional biosynthesis genes of fatty acid or lipid metabolism selected from the group of acyl-CoA dehydrogenase(s), acyl-ACP [= acyl carrier protein] desaturase(s), acyl–ACP thioesterase(s), fatty acid acyltransferase(s), acyl-CoA:lysophospholipid acyltransferase(s), fatty acid synthase(s), fatty acid hydroxylase(s), acetyl-coenzyme A carboxylase(s), acyl–coenzyme A

oxidase(s), fatty acid desaturase(s), fatty acid acetylenases, lipoxygenases, triacylglycerol lipases, allene oxide synthases, hydroperoxide lyases or fatty acid elongase(s).

7. (Currently amended) The gene construct according to claim 5 ~~or 6~~, wherein the nucleic acid construct comprises additional biosynthesis genes of fatty acid or lipid metabolism selected from the group of Δ-4-desaturase, Δ-5-desaturase, Δ-6-desaturase, Δ-8-desaturase, Δ-9-desaturase, Δ-12-desaturase, Δ-5-elongase, Δ-6-elongase or Δ-9-elongase.

8. (Currently amended) A vector comprising a nucleic acid according to ~~claims 1 to 3 or a gene construct according to claim 5~~ claim 1.

9. (Currently amended) A transgenic nonhuman organism comprising at least one nucleic acid according to ~~claims 1 to 3, one gene construct according to claim 5 or one vector according to claim 8~~ claim 1.

10. (Original) The transgenic nonhuman organism according to claim 8, where the organism is a microorganism, a nonhuman animal or a plant.

11. (Currently amended) The transgenic nonhuman organism according to claim 9 ~~or 10~~, where the organism is a plant.

12. (Currently amended) A process for producing polyunsaturated fatty acids, ~~where~~ wherein the process comprises ~~the~~ culturing ~~of~~ a transgenic organism which comprises a nucleic acid according to ~~claims 1 to 3, a gene construct according to claim 5 or a vector according to claim 8~~ claim 1 encoding a Δ-4-desaturase which specifically desaturates ω-3-fatty acids, and ~~where~~ recovering the polyunsaturated fatty acids ~~which have an increased content of ω-3-fatty acids are formed in the organism through the activity of the Δ-4-desaturase~~.

13. (Original) The process according to claim 12, where docosahexaenoic acid is produced in the process.

14. (Currently amended) The process according to claim 12 ~~or 13~~, where the polyunsaturated fatty acid molecules are isolated from the organism in the form of an oil, lipid or a free fatty acid.

15. (Currently amended) The process according to ~~any of claims 12 to 14~~ claim 12, where the organism is a microorganism, a nonhuman animal or a plant.

16. (Currently amended) The process according to ~~any of claims 12 to 15~~ claim 12, where the organism is a transgenic plant.

17. (Currently amended) An oil, lipids or fatty acids or a fraction thereof produced by the process according to ~~any of claims 12 to 16~~ claim 14.

18. (Currently amended) An oil, lipid or fatty acid composition which comprises ~~PUFAs~~ polyunsaturated fatty acids produced by a process according to ~~any of claims 12 to 16~~ claim 12 and is derived from transgenic plants.

19. (Currently amended) ~~The use of~~ An animal feed, human foods, cosmetics or pharmaceuticals, which contains the oil, lipids or fatty acids according to claim 17 ~~or oil, lipid or fatty acid composition according to claim 18 in animal feed, human foods, cosmetics or pharmaceuticals~~.

20. (New) An animal feed, human foods, cosmetics or pharmaceuticals, which contains the oil, lipids or fatty acids composition according to claim 18.